User's Manual

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Register Your Commander

Please register your Commander products so we provide you with easy access to our friendly customer service department. Registering your device will also guarantee that you will be fully covered under your warranty.

Registration also provides you with these extra benefits:

New product upgrades
New product announcements.
Seminar announcements.
Special offers.

For your convenience, a registration card is included with your order. Simply fill it out and return it to JTECH.

Commander Warranty

One-year Limited Warranty

The Commander™ console and PinchTrack™ transducer are designed to perform reliably and to meet specifications. In spite of diligence in manufacturing, eliminating malfunctions resulting from random component failure is impossible. Therefore, JTECH will at its option repair or replace the product with a new or reconditioned unit at no charge for a period of one year from the date of purchase.

In view of the varied conditions in which the unit will be used, the Commander Console and PinchTrack are sold "as is" and JTECH's responsibility does not go beyond the terms set forth above. JTECH will not be responsible for medical expenses or any direct, indirect, or consequential damages arising from the use of this product. JTECH shall in no way be liable for loss of revenue or profits resulting or alleged to result from use of this product.

THIS WARRANTY IS MADE EXPRESSLY IN LIEU OF ANY OTHER WARRANTY, EXPRESS OR IMPLIED, INCLUDING AN IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. UNDER NO CIRCUMSTANCES SHALL JTECH BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES. THE REMEDIES SET FORTH IN THIS WARRANTY SHALL BE THE ONLY REMEDIES AVAILABLE, EXCEPT AS SPECIFICALLY PROVIDED BY STATE LAW. NO PERSON HAS ANY AUTHORITY TO BIND JTECH TO ANY REPRESENTATION OR WARRANTY EXCEPT AS SPECIFICALLY SET FORTH HEREIN.

To have your Commander or PinchTrack repaired:

1. Contact JTECH Customer Service and describe the problem. After receiving a return authorization number, return the product to JTECH, including all accessories, postage paid and insured to JTECH. ***JTECH is not responsible for damages or losses incurred in shipping.***
2. Submit proof of purchase and date.
3. Include a brief explanation describing the problem.

Features and Benefits

PinchTrack™ Dynamometer:

- Uses standard gauge for comparison to published norms.
- "Axis Compensation" smart load cell maintains accuracy even if force is applied off-center.
- Precision technology achieves greater than 99% force accuracy.
- Upgradable to Tracker™ computerized testing system.

Commander™ Console:

- Easy-to-read 1.5" high LCD display.
- Operates during exams either as a wrist unit or as a desktop system using the included longer cable.
- Gathers, stores, and analyzes up to 25 bilateral pinch strength tests, including up to four repetitions per side.
- Calculates CV, fatigue, maximum force and average force for each repetition.
- Documents outcomes assessment with the automatic bilateral deficit analysis.
- Test can be timed from 1-5 seconds to document fatigue, or untimed for maximum force measurements.
- Helps determine consistency of effort in workers compensation and FCE exams.
- Test now, record later because the exam is stored in memory, even when Commander is turned off.
- Automatic audio prompts examiner for the next test in the series and provides motivation during timed tests.
- Measures up to 50 pounds for very strong performers.
- Battery powered for portable operation.
- Test protocols can be customized according to number of tests, starting force, newtons/pounds, test time and number of repetitions.

Check Your System

Your PinchTrack Commander system should include the following parts:

Commander Wrist Unit

PinchTrack Dynamometer

Short Cord

Long Cord

Worksheets

Make sure the serial number on the PinchTrack matches the serial number on the Commander Console. If these numbers do not match, call JTECH Customer Service.

Proper Care

With proper care your new PinchTrack Commander will provide many years of worry free use. Do not immerse the transducer or the console in water, place in an autoclave or sterilize with harsh disinfectants. Clean the housings with a soft, non-abrasive cloth moistened with clean water. Clean the display using a non-abrasive dry cloth. Do not use cleaners. Avoid dropping the unit or banging it against hard objects. Do not stand on, apply more than 50 lb. of force, or use the transducer for anything other than pinch strength testing. Failure to follow these policies will void the warranty.

Calibration

To ensure accuracy the PinchTrack and Commander console have been factory calibrated with weights traceable to the National Institute of Standards and Technology. When turned on the Commander console automatically zero calibrates itself. Therefore, make sure no force is being applied to the transducer when the Commander console is turned on. Any force applied to the transducer when the console is turned on will become the zero value and will result in inaccurate force readings.

Battery Life

The Commander console uses a standard 9 volt alkaline battery. The estimated battery life is 28 hours of operation. The Commander console should always be turned off when not in use to maximize battery life. (The console will automatically shut itself off after four minutes of inactivity.) NiCad batteries can be used, however, the active battery life will be reduced to approximately eight hours or less. When using a NiCad battery, completely drain the battery before recharging to prevent “memory” in the battery that will further reduce battery life.

Available Upgrades

The PinchTrack™ can be used with the following upgrade products**:**

Pinch Strength Test

#	Max. Reps (lbs.) 1	2	3	4	Ave	CV	Fat	Def
1R	17.5	18.2	17.1		17.6	3%	0%	
1L	16.7	17.0	16.4		16.6	2%	0%	-4%
2R	26.0	24.2	24.3		24.8	4%	1%	
2L	26.4	23.9	24.4		24.8	4%	0%	
3R	23.9	23.7	23.4		23.6	1%	0%	
3L	22.7	21.9	22.1		22.2	2%	1%	-5%

Consistency of Effort: 6 of 6 CV's valid
Test Time: 3 sec.
Ave. = average CV = coef. of variation
Fat. = fatigue Def = bilateral deficit

Reporter™ - This unique reporting system provides hard-copy documentation of tests while maintaining portability. The Reporter features a report printer built into a carrying case that holds up to four Commander™ products. Reports include all repetitions and statistics for up to 25 tests. The case is compact (15" x 11" x 5") for easy portability.

Download Software Kit - Transfer Commander test data easily to virtually any wordprocessor, exam form or spreadsheet with Commander Download Software. This Windows™ based package includes software and serial cable for transferring test data. The software will automatically download all repetition and statistical information and the titles of each test**.**

Tracker™ Software Package- PinchTrack comes ready to plug into the leading Windows-based musculoskeletal evaluation software package. The package includes the Tracker Interface Box™ for connecting to a PC. The PinchTrack™ dynamometer plugs into the "Pinch" port of the Tracker Interface Box™ without any modifications. Tracker™ software automatically records test results, analyzes statistics, makes comparisons to previous tests during exams, works seamlessly with other Tracker diagnostic devices, outputs data in a comprehensive report format.

For more information on upgrades, contact your JTECH sales representative or call JTECH at 1-800-985-8324.

Wrist and Desktop Use of the Console

The PinchTrack Commander system comes equipped with two cords for connecting the dynamometer to the console unit. The short cord is used when the Commander console is strapped to the examiner's forearm. The longer cord is used when the Commander console is placed on a desktop or left in the case during testing.

The cords connect to the console and dynamometer with telephone-jack plugs. To remove a cord, press down on the cord-jack's plastic release lever and slide the end out of the receptacle. When installing a cord, make sure the jack "snaps" securely into place.

NOTE: *If a cord is damaged or lost, do not attempt to replace with a standard telephone cord as the wiring is not the same. Contact JTECH Customer Service for the correct replacement cord.*

Using the Commander Console

Conventions

This manual adopts the following conventions throughout:

Test Refers to one strength assessment that may include multiple repetitions and comparisons between the right and left side. For instance, testing tip pinch strength with three repetitions for the right side and three repetitions for the left side is one test.

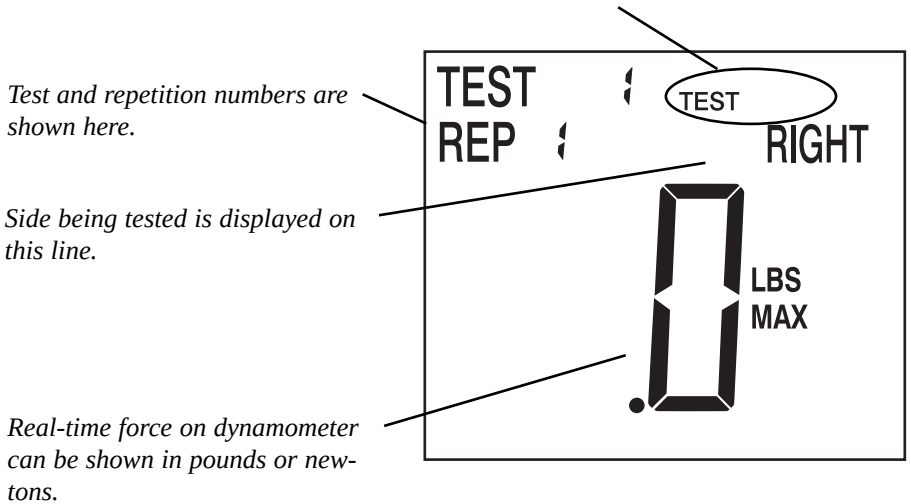
Exam Refers to multiple tests. For example, testing tip, key, and palmar pinch strength could comprise one exam.

On/Off Button

Press the button once to turn on, press again to turn off. Exams stored in memory are not erased when power is turned off. Pressing this button and holding for two seconds deletes stored exams. (For information about deleting tests, see Advanced Console Features on page 9.) The console will shut off automatically after four minutes of inactivity.

Note: *Make sure no force is applied to the dynamometer when turning the console on.*

When the console unit is turned on it will activate in either "Test" mode or "Review" mode, depending on whether an exam is stored in memory. If no exam is stored in memory the console will activate in Test mode ready for test #1.


The active "mode," in this case "TEST," is displayed in this area.
Test and repetition numbers are shown here.
Side being tested is displayed on this line.
Real-time force on dynamometer can be shown in pounds or newtons.
TEST
REP
TEST
RIGHT
LBS
MAX

Testing Mode

If an exam is in memory when the console is turned on, Commander activates in "Review" mode. From this point you can review exam data, change to "Test" mode to finish testing, or delete the exam. See the appropriate headings below.

Setup Mode

Testing Defaults

The Commander console enables you to use the "Setup" mode to control a variety of test parameters, such as the testing threshold, number of tests, test time, number of repetitions per test, and force readings in pounds or newtons. Once test parameters are set, they become the defaults for the console. For example, if you set the number of repetitions to three, then the unit will test for three repetitions per side for every exam until you change the default. Default settings do not change when the unit is turned off or when an exam is deleted. Defaults can only be reset manually.

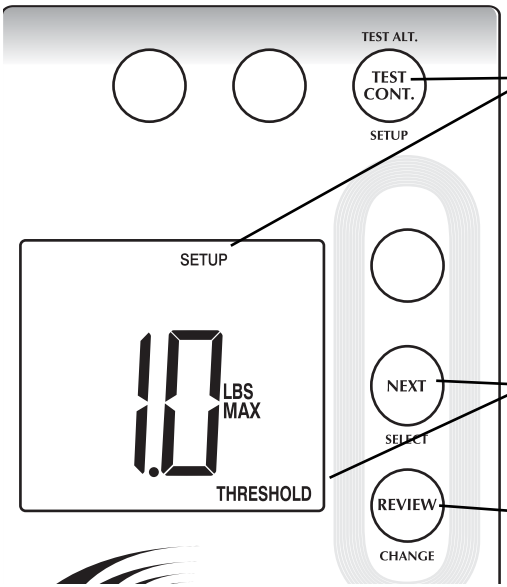
Setting Defaults

Three buttons are used when setting console defaults: SETUP, SELECT, and CHANGE. The buttons function as follows:

SETUP: Press this button until "Setup" is displayed at the top of the LCD. It is also used to exit "Setup" after setting parameters.

SELECT: Use this button to advance and select the parameter to be changed.

CHANGE: This button changes the parameter setting.



Press this button until console is in "Setup" mode. After parameters are set, use this button to exit back to "Test" mode.

While in "Setup" mode, use this button to advance through parameters.

When a parameter is displayed, use this button to change the default setting.

Adjustable Defaults

The PinchTrack Commander console allows you to control the following default parameters:

THRESHOLD: This setting determines the amount of force that must be exerted against the dynamometer before the console begins recording data. This setting is used to avoid inadvertently beginning a test. **It can be set at .4, 1, 3 or 5 pounds.**

TEST TIME: Determines the length of a sustained test in seconds. During the test the buzzer sounds. The test ends when either the allotted time expires or the force drops below the threshold value. Test Time can be set from 1-5 seconds or to "blank" for untimed tests.

TEST: Controls the number of tests available for an exam. The console automatically goes into "Review" mode when the number is reached. It can be set from **5-25 in increments of five**.

REP: Sets the number of repetitions per side per test. It can be set from **1-4**. A minimum of two repetitions is required for CV calculations.

LBS (N): This parameter controls whether force readings are in pounds or newtons.

Test and Test Alt Modes

Tests are conducted using either the "Test" or "Test Alt" modes. (How the modes are used is described below.)

To conduct a test, apply pressure on the dynamometer. Test recording begins when the default threshold force is exceeded. A test ends when test time expires or the force on the dynamometer drops back below the threshold. The display then indexes to the next repetition in the series. After all repetitions for a test are completed, the display indexes to the next sequential test number. Continue testing with this method until all tests are recorded in memory.

Repetitions for a Test

The Commander console can record and average up to four strength repetitions per side for each test. The repetition order is selected by either of two methods:

Same Side Repetition Order: When "Test" mode is displayed, the unit prompts for all right side repetitions first, then all left side repetitions.

For example, if the default is two repetitions, the test sequence in "Test" mode is:

TEST 1 REP 1 RIGHT
TEST 1 REP 2 RIGHT

TEST 1 REP 1 LEFT
TEST 1 REP 2 LEFT

TEST 2 REP 1 RIGHT
TEST 2 REP 2 RIGHT ....etc.

Helpful Hint: If unilateral testing is required, the right side can be tested and the left side skipped by pressing the "NEXT" button, or the right side can be skipped by pressing "NEXT" and testing the left side.

Alternating Sides Repetition Order: When "Test Alt" mode is displayed, the repetitions alternate between right and left side as follows:

TEST 1 REP 1 RIGHT
TEST 1 REP 1 LEFT

TEST 1 REP 2 RIGHT
TEST 1 REP 2 LEFT

TEST 2 REP 1 RIGHT
TEST 2 REP 1 LEFT ....etc.

This method can be used if submaximal effort is indicated. By mixing up the left and right side routine, the subject may have a more difficult time repeating the results on each side as indicated by the coefficient of variation.

Testing Methods

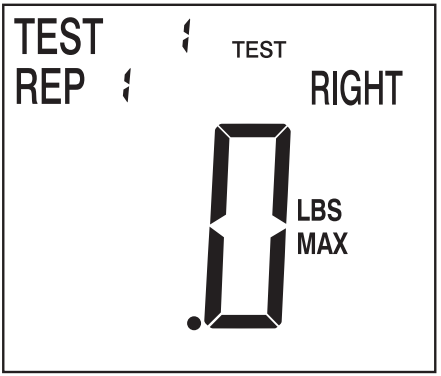
The Commander console can store up to 25 tests in memory complete with data for all repetitions and statistics. In order to easily record multiple tests the Commander uses Automatic Indexing™. This method automatically indexes the display to the next test in the series without requiring you to press any buttons. For example, after completion of all right and left side repetitions of test 1, the display indexes to TEST 2 REP 1 RIGHT.

NOTE: After completing a test, Commander prevents inadvertent deletion of tests previously stored in memory by indexing to the next test not completed. For example, if test 2 was completed previously, after test 1 is completed Commander will skip test 2 and index to test 3.

Sequential Testing Method

This method always begins with test 1 and uses Automatic Indexing™ to proceed from test 1 to test 2, etc. Test results should be marked on the exam worksheet corresponding to the test numbers from the display.

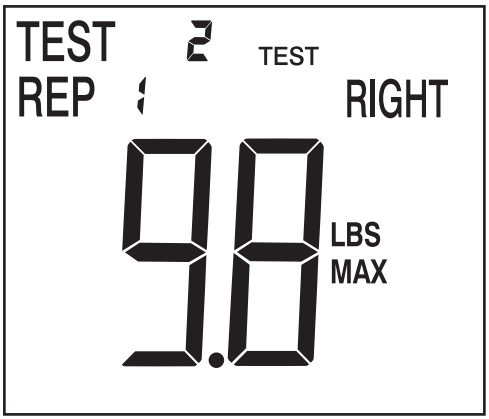
Helpful Hint: Since the display indexes past old tests stored in memory, this method is recommended only if all previous tests have been erased.



In this example, the test results would be written under #1 on the worksheet.

Assigned Testing Method

This method is used for conducting a tip, key, and palmar series of pinch tests. In this method, tip is assigned test 1, key test 2, and palmar test 3.



In this example, test number 2 on the display corresponds to a key pinch test.

Helpful Hint: You should be careful to select the proper test number for the type of test before beginning. When performing a standard tip, key, and palmar series (in this order) you can use Automatic Indexing™ to move from one test to the next in the series. Use care to begin the series at test number 1 and to use the assigned order.

Advanced Console Features

Press “REDO” to test the last repetition again. This feature is helpful if the current test was started inadvertently, was done incorrectly or was for practice.

Redo or delete other tests - Press “REVIEW” then press “NEXT” until the correct test number is displayed. While holding the “REVIEW” button down, press “Redo.” The entire test, including all right and left side repetitions, will be deleted. Then redo all repetitions for the deleted test.

Important Note: When using “REDO” for a test, the entire test, including repetitions for the right and left side, are deleted. Once a test is deleted it cannot be recovered later.

Review last repetition - To review the measured force for the last repetition, press "REVIEW" after the repetition is complete. To review other statistics associated with the test, continue pressing "REVIEW," and the display will scroll through all available statistics. To continue testing with the next repetition, press "TEST CONT." To erase the repetition and start over, press "REDO."

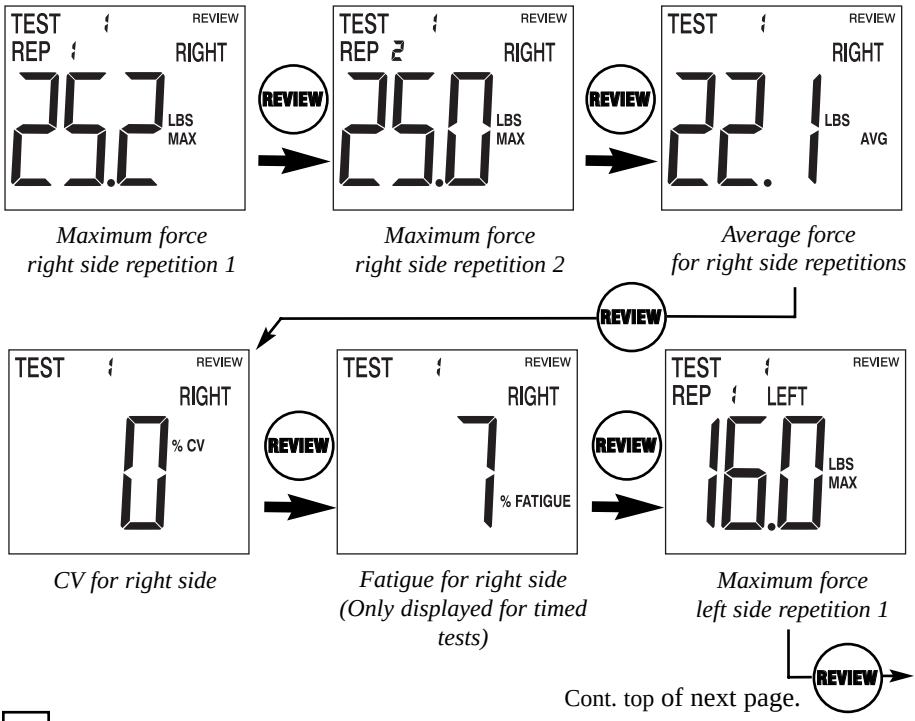
Reviewing an Exam

An exam can be reviewed at any time, either during testing or after, by pressing the "REVIEW" button. The last completed repetition will be displayed. To review other tests within the exam, press "NEXT" to advance to the next test with recorded data. When advancing through tests, the Commander display shows the test number with the right side repetition. To see left side repetitions and additional statistics press "REVIEW."

Statistics

To scroll through and review all the statistics for the displayed test, continue pressing "REVIEW." Press "Next" to view statistics for the next test.

In the following example, the statistics for test 2 are displayed in the order they will appear by pressing "REVIEW." The number of repetitions was set at two:



Maximum force right side repetition 1

Maximum force right side repetition 2

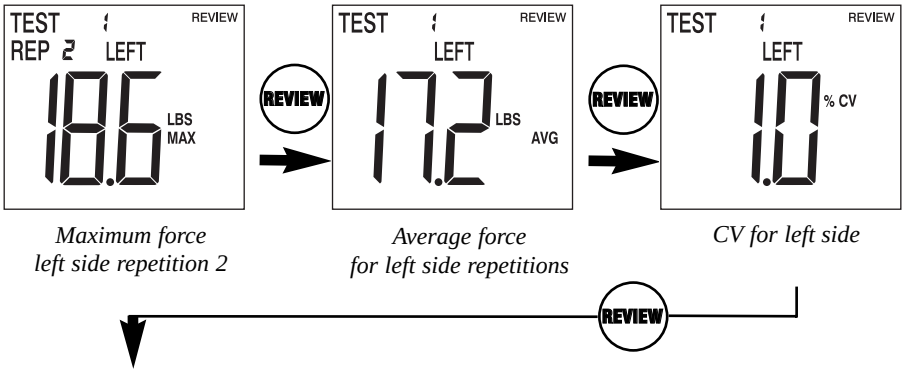
Average force for right side repetitions

CV for right side

Fatigue for right side (Only displayed for timed tests)

Maximum force left side repetition 1

Cont. top of next page.



Maximum force left side repetition 2

Average force for left side repetitions

CV for left side

Fatigue for left side (Only displayed for timed tests)

Bilateral deficit left side

After all statistics have been selected, the display circles back to the beginning.

To view the next test, press "NEXT." The display indexes only to test numbers with data.

Statistics Definitions

LBS: In "Test" and "Test Alt" modes LBS displays force against the dynamometer in real-time. In "Review" mode, LBS shows maximum force that was applied to the dynamometer for the displayed repetition.

AVG: The average force of all repetitions for the indicated side.

% CV: The coefficient of variation for all the repetitions for the indicated side using the n-1 method.

% Fatigue: Calculated only for timed tests using the highest force repetition for the indicated side. Fatigue shows the reduction in force at the end of a timed test compared to the maximum force reached during the same test. For example, if the maximum force reached is 100 lb. and the force at the end of the test is 80 lb., the fatigue is 20%. The fatigue formula is:

$$\frac{100 - 80}{100} \times 100$$

Note: If test ends before test time expires, % Fatigue will be 100%

%Deficit: Bilateral deficit indicating weakness of one side compared to the other.

Deleting an Exam

To erase an exam, turn the Commander console on, then press and hold the on/off button for a minimum of two seconds, or until the unit reactivates. The unit will beep and turn off indicating data has been erased.

Note: All test default values will be retained.

Printing Reports

Reports can be printed by two methods:

Method 1:

PRINT

Connect the Commander to the Reporter printer using the supplied cable. Press "PRINT" to generate a complete report of all the test results including statistics.

Method 2:

Connect the Commander unit to a personal computer using the optional serial interface cable. Use the optional Commander Download software to transfer all tests and statistics to a wordprocessor, report, or spreadsheet.

PinchTrack Worksheet

PinchTrack Commander includes worksheets for manually recording test data. The first three lines are assigned for tip, key, and palmar protocols, with the next seven lines available for custom tests. The worksheet provides spaces for maximum values and all calculated statistics in the order they appear when viewing in "Review" mode.

To reorder worksheets, call JTECH Customer Service at 1-800-985-8324.

Commander Pinch Strength Report

Name: _____ **Date:** _____ **Examiner:** _____

#	Test Description	Right						Left						% DIF
		REP1	REP2	REP3	AVE	%CV	%FAT	REP1	REP2	REP3	AVE	%CV	%FAT	
1	**Tip**													
2	**Key**													
3	**Palmar**													
4														% DIF
5														
6														
7														
8														
9														
10														

Footnotes:
1. Refer to Mathiowetz et. al., Grip and Pinch Strength:Normative Data for Adults, Arch Phys Med Rehabil , 1985; 66: 69-74 for pinch strength protocols and normative data.
2. "AVE" is average of performed reps, "%CV" is coefficient of variation for performed tests (minimum of 2 required).
3. "%FAT" corresponds to fatigue. It is only calculated if timed tests are used.
4. "%DIF" is the percent deficit existing based on a bilateral comparison of maximum values.

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Sample worksheet

The PinchTrack Dynamometer

Care and Cleaning

PinchTrack is an electronic device and, therefore, should not be submerged in liquid or placed in an autoclave. The device should be cleaned with a soft, non-abrasive cloth dampened with clean water. Do not use solvents, detergents or harsh disinfectants.

When not in use the device should be stored in the case provided. Avoid dropping or banging the device against hard objects. Never stand on, pound with or apply more the 50 lb. of pressure against the dynamometer.

Using the PinchTrack Dynamometer

Pinch Testing: When, Why, How Often?

There are many reasons to measure a patient's pinch strength. In worker's compensation cases, it may be necessary to establish if the patient can return to work. As part of a functional capacity evaluation, pinch strength testing can give an indication of sincerity of effort through coefficient of variation data, as well as an indication of the patient's ability to perform job-related tasks requiring manual dexterity or fine motor skills. As part of a screening, comparing a subject's strength relative to a normative database may be desirable. In the case of a post-offer, pinch testing may be used to help determine an employee's predisposition to repetitive motion disorders. With today's insurance companies requiring documentation of outcomes, testing new patients and establishing a baseline from which to assess treatment effectiveness (surgical, chiropractic or otherwise) may be extremely helpful.

When used as part of a functional capacity evaluation, the pinch strength testing portion of the exam should include, as a minimum, the three basic pinch tests: tip, key, and palmar.

A recently published rehabilitation protocol for patients with carpal tunnel syndrome suggests that pinch strength testing should occur as part of an initial exam that also includes orthopedic and neurological tests, nerve latency tests, range of motion and x-ray. This test could be as simple as a single tip pinch or a complete test including custom tests. The article indicates that after two weeks of intensive care treatment, the patient's pinch strength should be re-tested. After 6-8 weeks of rehabilitation care, the pinch strength should again be tested. Upon discharge of the patient, or release to pre-injury status, a final pinch strength evaluation should be performed.

PinchTrack Commander can also be used with custom pinch tests. This is especially useful in testing function in special populations who may have had amputations, surgical reattachments, or congenital defects.

Tip, Key, Palmar and Custom Pinch Testing

PinchTrack Commander provides the flexibility to perform a test at any or all of the three standard pinch test positions: tip (two-point), key (lateral), and palmar (chuck or three-point).

Tip Pinch Test

When using the assigned testing method for tip pinch testing, set the Commander display to TEST 1, REP 1, RIGHT, and record data on line 1, Tip, on the worksheet. Otherwise, make sure to record the results on the worksheet line that corresponds to the Commander test number used.

According to the American Society of Hand Therapists (1981) and Mathiowetz et al. (1984), the proper positioning of the patient for the pinch test is as follows:

> Seated, with the shoulder adducted and neutrally rotated, elbow flexed at 90°, forearm in neutral position, and the wrist between 0 and 30° extension and between 0 and 15° ulnar deviation.
>
> In all cases, the arm should not be supported. For the tip pinch, the pinch dynamometer is presented on its side and at a 45° angle to the forearm to maintain the standard forearm and wrist positions.
>
> The pinch gauge should be held at the distal end (by the examiner)...

Use the following standard instructions developed by Mathiowetz et al. (1984) for performing the test:

1. Tell the patient, “Place the tip of your thumb on this side, and the tip of your index finger on this side as if to make an “O.” Curl your other fingers into your palm as I am doing and pinch as hard as you can.”
2. Demonstrate the test, then give the pinch meter to the patient.
3. After the patient is positioned appropriately, say “Are you ready? Pinch as hard as you can.”
4. As the patient begins to squeeze, say “Harder!...Harder!....Relax!”
5. Repeat the test two more times, then move on to the other hand.

Pinch gauge presentation for tip pinch test.

Key Pinch Test

When using the assigned testing method for key pinch testing, set the Commander display to TEST 2, REP 1, RIGHT, and record data on line 2, Key, on the worksheet. Otherwise, make sure to record the results on the worksheet line that corresponds to the Commander test number used.

The proper positioning of the patient for the key pinch test is as follows:

> Seated, with the shoulder adducted and neutrally rotated, elbow flexed at 90°, forearm in neutral position, and the wrist between 0 and 30° extension and between 0 and 15° ulnar deviation. In all cases, the arm should not be supported...
>
> For the key pinch, the pinch dynamometer is presented horizontally in line with the forearm to maintain the standard forearm and wrist positions.
>
> The pinch gauge should be held at the distal end (by the examiner) and placed on the middle phalanx of the index finger.

Use the following standard instructions developed by Mathiowetz et al. (1984) for performing the test:

1. Tell the patient, “Place your thumb on top and your index finger below as I am doing and pinch as hard as you can.”
2. Demonstrate and then give the pinch meter to the patient.
3. After the patient is positioned appropriately, say “Are you ready? Pinch as hard as you can.”
4. As the patient begins to squeeze, say “Harder!...Harder!....Relax!”
5. Repeat the test two more times, and then move on to the other hand.

Pinch gauge presentation for key pinch test.

Palmar Pinch Test

When using the assigned testing method for key pinch testing, set the Commander display to TEST 3, REP 1, RIGHT, and record data on line 3, Palmar, on the worksheet. Otherwise, make sure to record the results on the worksheet line that corresponds to the Commander test number used.

The proper positioning of the patient for the palmar pinch test is as follows:

> Seated, with the shoulder adducted and neutrally rotated, elbow flexed at 90°, forearm in neutral position, and the wrist between 0 and 30° extension and between 0 and 15° ulnar deviation. In all cases, the arm should not be supported...
>
> For the palmar pinch, the pinch dynamometer is presented on its side and at a 45° angle to the forearm to maintain the standard forearm and wrist positions.
>
> The pinch gauge should be held at the distal end (by the examiner)...

Use the following standard instructions for performing the test:

1. Tell the patient, “Place your thumb on this side, and your first two fingers on this side as I am doing and pinch as hard as you can.”
2. Demonstrate and then give the dynamometer to the patient.
3. After the patient is positioned appropriately, say “Are you ready ? Pinch as hard as you can.”
4. As the patient begins to squeeze, say “Harder!...Harder!....Relax!”
5. Repeat the test two more times, and then move on to the other hand.

Pinch gauge presentation for palmar pinch test.

Custom Pinch Tests

When performing custom pinch tests with PinchTrack Commander, the test can be conducted at any test number setting. A simple description and test data should then be recorded on the corresponding number line on the worksheet.